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11 February 1963

Dear Joe,

In accordance with Work Statement Section 1b of contract RD-X-63, the items listed below and described in Attachment A are estimated to be "Significant Projects" and can be expected to exceed $25,000. per item. They are submitted for your consideration and approval as applicable areas of investigation for R and D effort.

The costs estimated below are those associated with engineering, testing analysis, and fabrication of breadboard hardware to determine feasibility and operating parameters of the techniques and approaches to be developed.

Significant Projects	Estimated Factory Cost *
1. Frame by Frame Processor	25X1A [redacted] Being reviewed
2. Automation of I.R. Densitometer	Proceed
3. Automatic Exposure Control Printer	Being reviewed
4. Scanning and Recording Densitometer	Proceed
5. Reversal Versamat	Being reviewed
6. Evaluation of New Materials & Processes	Summarize Red Dot tests and submit recommendations
Total Factory Cost	
G & A	
Fee	
CPFF Price	

25X1A * The above notice to proceed was furnished

25X1A [redacted] by [redacted] 5119 (Ont 49447) dated 1 Apr 63.

SECRET

Preliminary investigation in these areas has been initiated, but they will not proceed beyond the $25,000. level without your specific authorization. A few other small R and D activities have also been started and can be described at the time of the first Quarterly Review Meeting.

Your early consideration will be appreciated.

Very truly yours,

F.G.F.

Orig. + 4cc: J.P.

Attachment A

Technical Description of Projects

1. Frame by Frame Processor.

At the present time a processing technique is employed which makes it possible to compensate for incorrect exposure settings in aerial photography. The fundamentals of this technique are, development of the image to the required gamma at a minimum photographic speed in a primary developer, and further development of selected subjects in a secondary developer to attain an optimum density level.

Processing machines available to exploit this technique are capable of varying secondary development in increments; however transition from one condition to another involves several frames of exposed material. The present trend toward small scale photography in which scene reflectance or exposure, changes rapidly from frame-to-frame, makes it imperative that equipment become available which has the ability to vary secondary development on a frame-by-frame basis with a transition length no greater than the distance between frames.

It is the purpose of this proposed project to investigate the means by which secondary development may be done on a frame-by-frame basis, design the necessary components to carry out these investigations and finally to build breadboard equipment to explore ideas evolving from the investigation.

2. Automation of I.R. Densitometer.

The present I.R. Densitometer on the Trenton Processor is semi-automatic, requiring operator attention to determine areas to be scanned and to carry out the instruction of the scanner. This development will produce apparatus which will automate the entire scanning operation as well as performing action at the command of the scanner output. The apparatus will be primarily electronic control circuits and I.R. detectors added to the present I.R. scanners.

3. Automatic Exposure Control Printer.

Present day high speed continuous printers such as the Niagara printer can be manually set to a fixed exposure level but cannot vary the exposure within a single roll.

It is proposed to investigate and develop breadboard type apparatus which will exploit the possibilities for automatic control that do not involve dodging or changing the effective curve shape of the print material. This developmental control unit is intended for installation on a continuous contact printer running at constant velocity with exposure controlled by modulation of the printing light source intensity.

4. Scanning and Recording Densitometer.

In making quality prints from aerial photography much skilled operator time is required in spot densitometry of selected image areas, and computation of exposure prediction for the printer. We propose to develop a scanning densitometer capable of reading stationary or moving film and equipped with recording devices to aid in the exposure prediction. Successful completion of the development program will provide an engineering model capable of scanning selected areas of 70mm to 9-1/2-inch wide film and of providing graphs of pertinent data for exposure prediction.

5. Reversal Versamat.

A requirement exists in the Photo Interpretation Community for a versatile photographic processing apparatus capable of developing both wide sheets and continuous strips of film to either a reversal or a standard negative image. Change from the reversal to the negative to the reversal processing cycle should be quickly and easily accomplished by turning valves, resetting switches and changing control set points in a minimum of time.

It is proposed to redesign existing self threading processing equipment to incorporate the reversal processing cycle in the machine and to incorporate the necessary valves, switches and control equipment to affect this change.

The operating speed of this processor will be approximately twenty inches per minute when used for reversal processing or approximately twenty feet per minute when used for standard negative processing. It will be capable of simultaneously processing two strands of material ranging from nine and one half inches wide down to seventy millimeters wide and three strands of material seventy millimeters wide and narrower. Over-all length of the machine will be approximately sixteen feet.

6. Evaluation of New Materials and Processes. (Red Dot Tests)

As new and improved films and film-process systems become available it is necessary to evaluate their applicability to specific reconnaissance systems and requirements, and to determine proper exposure, latitude, spectral region, and processing. This task will include the necessary high altitude flight testing, production processing, and analysis required for satisfactory evaluation of the materials.